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ABSTRACT

This study examines whether changes in teacher compensation, specifically increases in salary, could improve student performance. Studies show that performance based award systems for teachers can increase their motivation to improve instruction. Data were collected from nine randomly chosen states. Each state's average teacher salary was compared to that state's per capita income. Ratios were constructed with the information and correlated to students' average performance on the National Assessment of Educational Progress mathematics assessment in grades 4 and 8, by state, for the years 1995-97. Though the resulting correlations did not show statistical significance, the general trend was a negative relationship. This implies that the better the teachers' salaries relative to other salaries in the area, the worse the students' performance. This could be due to the theory that teacher salary depends on the local teacher market and the concept of supply and demand. (Contains 14 references.) (SM)

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An Examination of Teacher Salary and Student Performance

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Abstract

Few would argue with the fact that the American educational system is in need of improvement. This study examines whether changes in teacher compensation, specifically increases in salary, could improve student performance. Studies show that performance based award systems for teachers can increase their motivation to improve instruction. In examining teacher salaries in different regions, though, it is necessary to take into account differences in the regions themselves, otherwise the data can be misleading. Data were collected from nine randomly chosen states. Each state's average teacher salary was compared to that state's per capita income. Ratios were constructed with the information and correlated to students' average performance on the National Assessment of Educational Progress mathematics assessment by state. Though the resulting correlations did not show statistical significance, the general trend was a negative relationship. This implies that the better the teachers' salaries relative to other salaries in the area, the worse the students' performance. A possible reason for this could be the theory that teacher salary depends on the local teacher market and the concept of supply and demand. In other words, areas that have more teachers available have lower average salaries than areas that compete for the available teachers. Further research should be undertaken to determine the best ways to improve education.

An Examination of Teacher Salary and Student Performance

Introduction

The United States has been termed 'a nation at risk' due to perceived inadequacies in the educational system. In seeking ways to ameliorate the problems in American education, possible causes must be sought from the influencing factors. Among these is the topic of teacher efficacy and whether teacher compensation affects the quality of education imparted. This study will examine if a correlation exists between average teacher salary and student learning as measured by performance on a standardized test.

Review of the Relevant Literature

Comparisons of teacher salaries have been the concern of many a state education department over the years. Oftentimes, states will compare their average teacher salaries to the national or regional averages and use that information as the basis for lobbying for teacher raises. State by state comparisons, however, do not take all of the information into consideration. One point that can be made is that average teacher salaries in a state do not reflect severe discrepancies that can exist within the state. Zuckman (1993) illuminated how extreme some differences could be when she compared two school districts in Illinois. The average teacher salaries for the two actually differed by $21,000. One can see how drastic differences such as this could have misleading effects on averages compiled by state.

Publications that report other data along with the average teacher salaries can paint a more complete picture. Bushweller & Zakariya (1997) presented tables that provided state by state data grouped by region that included average teacher salaries, percentages of funding sources, per capita income, classroom characteristics and

standardized test scores. Even with all the information provided, though, misconceptions could be drawn, since the standardized test score averages listed were from the Scholastic Assessment Test (SAT), which is not used equally in all parts of the country, as is evidenced by the percentages listed of graduates taking the test. A more complete report was given by Bell (1984) who listed the aforementioned statistics in addition to listing information about poverty rates in the states. The standardized test data was reported using both the SAT and the American College Testing Program Assessment (ACT), reporting the average scores of the test that was used more prevalently in that state. Rankings for the states were given in each category, with the test scores having two separate categories, reflecting the different emphases on the SAT or the ACT. Looking at the rankings in any one category could be misleading if not combined with information from other categories. Rotberg (1998) illustrated how erroneous conclusions could be drawn from rankings. In examining a ranking of performance of states by SAT scores, one would get a very different impression than if one examined the educational performance of states as measured by the National Assessment of Educational Progress (NAEP) test. Rotberg also pointed out that one could get an idea of some of the problems facing the states by their relative positions on test scores and the corresponding poverty rates of that state.

Looking at teacher salaries alone and comparing their averages across states would not provide a fair comparison. Teacher salaries should be considered in relation to average income for the area and the relative costs of living. Looking at test scores compared across states could also be misleading if the test one chose to compare was not equally used in those states. Even the NAEP test was not conducted in all states since

participation was on a voluntary basis rendering a comparison of all 50 states on their test performance impossible (Shaughnessy, Nelson, & Norris, 1997).

Regarding teacher efficacy, can teacher pay influence teacher performance and by extension student performance? The question of whether teachers should be paid on the basis of their performance has been examined in a number of ways across the country. Often, merit pay programs have been vigorously opposed by teacher unions due to factors that affect student performance which are beyond a teacher's control (Thurman & Axtman, 1999). Lack of ways to compare and reward teacher performance does a disservice to effective teachers who work tirelessly at their jobs yet get paid the same and get the same raises as teachers who are ineffective, uninspired or apathetic. Most nonteaching professions have ways of compensating employees bases on performance, rather than simply number of years of service which is the primary compensation model used in education (Hoerr, 1998). Programs in educational systems implementing performance based awards have been proposed or have been undertaken in cities in Colorado, Minnesota, New York, North Carolina, Ohio, Texas and the entire state of Kentucky (Heneman & Milanowski, 1999; Kelley, 1999; Milanowski, 1999; Thurman & Axtman, 1999).

The performance based award program in Kentucky rewarded performance of schools based in part by students' scores on standardized tests. The schools that met their performance goals were given monetary awards that could then be translated into teacher bonuses. Although there were problems with the program, such as awarding bonuses to entire schools regardless of individual teacher performance, it did result in increased teacher motivation to improve instruction (Heneman & Milanowski, 1999; Kelley, 1999).

The use of standardized tests for this purpose may fuel the fires of those already opposed to standardized tests. Opponents of standardized testing argue that it places too much pressure on students and that it forces a standardized curriculum leaving little room for individual desires or needs. A study by Phelps (1998) challenged the notion that standardized tests are not needed or wanted. Through the examination of a number of surveys, Phelps found a vast majority of the public including educators, parents, and students desired the use of standardized tests for accountability purposes, be it accountability of the student, of the curriculum, or of the teacher (as it is partly used in performance based award programs).

If pay bonuses can have an effect on teacher motivation, then how much does teacher salary affect teacher performance?

Method

Subjects

Ten states were randomly selected using a table of random numbers. One of the states, South ~~Carolina~~ Dakota, did not participate in the NAEP testing program and therefore had to be excluded from the study. Data from the remaining nine states were compared and are listed in Table 1.

Procedure

Information was collected from each of the nine participating states concerning per capita income, average teacher salaries, and NAEP mathematics assessment scores for the 4th and 8th grades, all for the years 1995-1997. Sources for this data included the National Educational Association (NEA), the National Center for Educational Statistics (NCES) and the report by Bushweller & Zakariya. Ratios constructed from average

teacher salaries were compared rather than the salaries themselves to control for differences in average incomes and cost of living across states.

Results

The data was compared using two correlational techniques. The data set compared the ratio of average teacher salary and per capita income for 1996-97 to the average of the test scores of the 4th and 8th graders on the 1996 NAEP test. Figure 1 shows a scatter plot of the data. The Pearson correlation was calculated yielding $r = -.329$, which was not a statistically significant correlation. The analysis was also calculated using the Spearman rho statistic, which calculates a correlation based on ranking of the data. This also revealed a weak negative correlation with $r = -.350$.

Despite the fact that the results were not statistically significant, the results will be examined briefly. The fact that the correlations were negative implied that the greater the teacher salary relative to local salaries, the lower the actual average student test scores. This result appears to be counterintuitive since one would think that higher salaries would yield better performances. It would appear then that student performance had less to do with teacher salary, but more to do with average salaries in the area.

Conclusions

Can increased teacher salaries improve student learning? The results of the analyses performed would suggest not. Several variables that could have had an impact on the results might have skewed the findings. As Zuckman (1993) illustrated in her study, reported averages might not be a very accurate representation of the actual situation in specific schools and districts. Rotberg (1998) showed how the process of ranking is fraught with problems.

A study by Merrifield (1999) showed that various teacher salaries in Texas have less to do with performance or qualifications than location and competition. His argument was that teacher salaries were greater when they were in areas were the demand for a limited pool of teachers was greatest and the competition among neighboring districts forced the salaries higher. It may be that if competitive salaries abound in an area where teachers are greatly needed, the less qualified applicants may be hired merely due to the demand for their services.

One must consider all possible sources when seeking ways to improve teacher performance, not just teacher salaries. Howard (1994) conducted a study comparing the profession of teaching in the US to other professions and other countries. Perhaps the US should look to extending the school year and allowing more preparation time for teachers in order to compete with educational situations internationally.

All in all, one must consider a great number of factors toward improving education. Teaching is known to be a profession with little reward, monetary or otherwise, and a large number of qualified people are drawn away by the allure of other professions. There is no simple answer, though, as increasing salaries by itself would not be a guarantee of a better-educated America. Close examination of each of the factors involved in education is needed if real progress is to be made.

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Table 1:
Data for states included in the study

State	Average teacher salary 1996- 97	Per Capita Income 1997	4th grade test scores	8th grade test scores
Alabama	$32,549	$20,055	212	257
Connecticut	$50,426	$33,189	232	280
Indiana	$38,575	$22,420	229	276
Iowa	$33,275	$22,560	229	284
Maine	$33,800	$20,826	232	284
Massachusetts	$43,806	$29,439	229	278
Mississippi	$27,720	$17,471	208	250
South Carolina	$32,659	$19,755	213	261
Texas	$32,644	$22,045	229	270

Figure 1: